

REMARKS

Applicants thank the Examiner for the very thorough consideration given the present application. Claims 1-5 are currently pending in this application. No new matter has been added by way of the present amendment. For instance, the amendment to claim 1 is supported by the Specification at, for example, page 19, lines 28-33, page 25, lines 15-17, page 27, lines 12-17, and page 31, line 1. Accordingly, no new matter has been added.

At the outset, the present application is believed to be in condition for allowance. Entry of this amendment is requested under 37 C.F.R. §1.116, as the amendment raises no new issues which would require further search and/or consideration by the Examiner. Alternatively, Applicants request entry of the amendment in order to place the claims in better form for consideration on Appeal.

In view of the remarks herein, Applicants respectfully request that the Examiner withdraw all outstanding rejections and allow the currently pending claims.

Issues Under 35 U.S.C. § 103(a)

Claims 1-5 stand rejected under 35 U.S.C. 103(a) as being obvious over Momoda et al. (U.S. 2005/0263745) (also WO 01/05854) (hereinafter Momoda '745) in view of Chen et al. (WO 98/38924) (hereinafter WO '924). Applicants respectfully traverse.

The Examiner maintains his previous position that Momoda '745 discloses a curable photochromic composition and article, wherein the composition comprises a photochromic compound, and acrylate and epoxy monomers. The Examiner acknowledges that Momoda '745 fails to teach the claimed silanol or silanol-yielding compounds, and relies on the teachings of

WO '924 to cure this deficiency, asserting that WO '924 teaches radically polymerizable silane-containing monomers used in photochromic coating compositions.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). “[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.” *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. *KSR Int’l Co. v Teleflex Inc.*, 82 USPQ 2d 1385 (U.S. 2007). There must be a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. *Id.* The Supreme Court of the United States has recently held that the “teaching, suggestion, motivation test” is a valid test for obviousness, albeit one which cannot be too rigidly applied. *Id.* “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

The present invention is directed, *inter alia*, to a curable composition consisting of (1) 0.1 to 20 parts by weight of a silicon compound having a silanol group or a functional group capable of forming a silanol group upon hydrolysis and no radically polymerizable group, (2) 100 parts by weight of a radically polymerizable monomer having a polymerizable group selected from the group consisting of (meth)acryloyl group, (meth)acryloyloxy group, (meth)acryloylamino group, (meth)acryloylthio group, vinyl group, allyl group and styryl group,

(3) 0.01 to 20 parts by weight of a photochromic compound, and (4) at least one optional component selected from the group consisting of a radical polymerization initiator, a curing catalyst for the silicon compound, a surfactant, an antioxidant, a radical scavenger, an ultraviolet light stabilizer, an ultraviolet light absorber, a release agent, a color protection agent, an antistatic agent, a fluorescent dye, a dye, a pigment, a perfume and a plasticizer, wherein the radically polymerizable monomer includes a radically polymerizable monomer having an epoxy group in the molecule (see, e.g., claim 1).

The present invention provides a curable composition capable of forming a photochromic coating layer which exhibits excellent photochromic properties, such as high color development density and fast fading rate, is free from the dissolution of a photochromic compound, exhibits high adhesion to a substrate through a simple pre-treatment and has excellent hard coating applicability (see page 3, lines 2-9, and page 3, line 31 to page 4, line 6 of Specification).

Applicants have discovered that, in order to obtain the effects of the present invention (see preceding paragraph), the following must occur:

- i) a silicon compound having a silanol group or a functional group capable of forming a silanol group upon hydrolysis and no radically polymerizable group (simply referred to as the “non-radically polymerizable silyl compound” hereinafter) (e.g., component (1) in claim 1) should not be copolymerized with a “radically polymerizable monomer” (e.g., component (2) in claim 1); and
- ii) the “non-radically polymerizable silyl compound” and a radically polymerizable monomer having an epoxy group in the molecule (referred to as

“epoxy monomer” hereinafter) should be used in combination (see page 4, lines 24-34 of Specification).

As shown in Comparative Example 4 of the Specification, when a silyl compound having a radically polymerizable group is used in place of the claimed non-radically polymerizable silyl compound, the effects of the present invention are not obtained. Moreover, when an epoxy monomer is not added to the composition, the durability of the photochromic compound and the adhesion of the photochromic coating layer degrade. Furthermore, the homogeneity of a cured product obtained from such a cured composition deteriorates (see page 49 and Table 4 of Specification).

As noted above, the components of the presently claimed composition are limited to the claimed components (1) to (4) (note that claim 1 is directed to a composition consisting of components (1) – (4)). Moreover, the present claims require that the radically polymerizable group of the radically polymerizable monomer (e.g., component (2) in claim 1) be limited to one selected from the group consisting of a (meth)acryloyl group, a (meth)acryloyloxy group, a (meth)acryloylamino group, a (meth)acryloylthio group, a vinyl group, an allyl group and a styryl group. Since all of these radically polymerizable groups undergo chain-transfer type radical polymerization, the composition of the present invention is thus limited to a composition which is polymerized and cured through chain-transfer type radical polymerization. Additionally, the present claims also make it clear that the non-radically polymerizable silyl compound (e.g., component (1)) is not copolymerized with the above radically polymerizable monomer (e.g., component (2)). Applicants respectfully submit that the cited references fail to teach or suggest a composition as claimed.

As correctly acknowledged by the Examiner, Momoda '745 fails to teach or suggest the claimed non-radically polymerizable silyl compound (e.g., component (1)). WO '924 fails to cure this deficiency. Moreover, Applicants respectfully submit that there is no rational underpinning to support the legal conclusion of obviousness, since the rejections include an improper combination of references.

The curable composition disclosed by Momoda '745 and the coating composition disclosed by WO '924 completely differ from each other in purpose, types of monomers used and polymerization mechanism. Therefore, one skilled in the art would not have been motivated to combine these compositions.

The curable composition of Momoda '745 comprises an acrylic radically polymerizable monomer as the main component, and a photochromic compound (see claim 1 of Momoda '745). Momoda's composition is mainly used in the inmass method, and its cured product itself becomes a substrate (see par. [0253] of Momoda '745). Therefore, Momoda '745 does not face and is not concerned with problems of adhesion to the substrate. Moreover, there is no inhibition of polymerization by oxygen because cast polymerization is carried out by using a mold.

In contrast, the coating composition disclosed by WO '924 is a "primer coating composition," which is used when a hard coating or an AR coating is to be applied to a polycarbonate-based lens substrate (e.g. CR-39). This composition comprises an effective amount (preferably 15-80 wt%) of a di- or poly-thiol compound as an essential component (see page 1, lines 5-25 and claim 1 of WO '924).

The coating composition of WO '924 aims to solve the problem of impact resistance degradation when a hard coating is applied to a substrate, and does not substantially undergo the

inhibition of polymerization even in the air. The latter feature is obtained because the coating composition of WO '924 is polymerized and cured through addition polymerization, making use of a so-called "polythiol-polyene reaction," with no or substantially no homopolymerization of the allylic or vinyl monomer (unlike a curable composition comprising an acrylic monomer as the main component) (see page 3, lines 11-20 of WO '924).

In view of the above, it is evident that the skilled artisan would not combine the teachings of Momoda '745 and WO '924 as proposed by the Examiner. Moreover, even if the teachings of these references were combined, one of ordinary skill in the art would not arrive at the present invention.

WO '924 discloses isocyanates, mercaptans, anhydrides, epoxides, silanes, carboxylic acids, amines, ketones and alcohols as examples of the "adhesion comonomer" (see page 27, line 2 to page 28, line 1 of WO '924). The silanes could include silane compounds having a methacryloyloxy group or a vinyl group. However, WO '924 provides no guidance or motivation for the skilled artisan to specifically select a non-radically polymerizable silyl compound as presently claimed.

Moreover, the epoxy monomer is not an essential component in either Momoda '745 or WO '924. However, as noted above, the present inventors have discovered that the epoxy monomer and the non-radically polymerizable silyl compound should be used in combination to obtain the superior effects of the present invention. Even if one skilled in the art would select a non-radically polymerizable silyl compound from the extensive list of comonomers disclosed by WO '924 (a point which Applicants do not concede; see preceding paragraph), he/she would not be motivated to combine the non-radically polymerizable silyl compound with an epoxy

monomer, as presently claimed.

Furthermore, even if one of ordinary skill in the art would select a non-radically polymerizable silyl compound from the extensive list of comonomers disclosed by WO '924 and would combine it with an epoxy monomer in the composition of Momoda '745, if this composition was used as a coating agent for forming a photochromic coating layer, it would still not achieve the superior effects obtained by the present invention, such as high adhesion to a substrate through a simple pre-treatment.

Since the curable composition of Momoda '745 and the coating composition of WO '924 differ from each other in the types of monomers used and the polymerization mechanisms employed (see above), the type of cured product to be bonded to the substrate inherently differs. As such, it is inconceivable that they would be similar in terms of adhesion to the substrate.

Additionally, as described in the Response to the previous Office Action, the adhesion comonomer of WO '924 (which the Examiner argues is equivalent to the presently claimed non-radically polymerizable silyl compound) is (co)polymerized with another monomer to form a copolymer (hence the use of the term "comonomer" by WO '924). In contrast, the presently claimed non-radically polymerizable silyl compound is not copolymerized. Therefore, the adhesion mechanism which occurs in WO '924 would not occur in the composition of the present invention. In fact, if a radically polymerizable monomer having a silanol group or a group capable of forming a silanol group upon hydrolysis (referred to as a "silyl monomer" hereinafter) is used as the adhesion comonomer in WO '924 and the same is added to a polymerizable composition as claimed, the superior effects of the present invention cannot be obtained (see Comparative Example 4 and Tables 3 and 4 of the present application).

Applicants note that the Examiner has taken the position that “the obtained results cannot be considered as unexpected results because the usage of silicon compounds having radically polymerizable group such as 3-mercaptopropyltrimethoxysilane, etc. in the curable compositions for forming a photochromic coating layer is well known in the art.” The Examiner cites Mogami et al. (U.S. Patent 4,556,605) to support this assertion (see outstanding Office Action at page 5, item no. 10). However, it is respectfully submitted that the photochromic coating layer disclosed by Mogami is a so-called “hard coating layer” (see Abstract), and is thus not obtained by polymerizing and curing a monomer, as in the present invention, Momoda ‘745 or WO ‘924. Therefore, Mogami does not suggest the superior effects of the present invention, and the teachings of this reference are not relevant to the present application.

Because the invention, as set forth in Applicants’ claims, is not disclosed or made obvious by the cited prior art, reconsideration and withdrawal of this rejection are respectfully requested.

Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and objections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Vanessa Perez-Ramos, Reg. No.

61,158, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

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